Exposure to risk factors for development of lower limb osteoarthritis during Air Force Initial Officer Training

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Background and aims

Occupations with high physical demands, such as the military, have been associated with an increased risk for developing, and worsening, osteoarthritis (OA) of the lower limb. The aims of this study were:

1) to analyse the exposure of Australian Air Force Officer Cadets to occupational tasks associated with an increased risk of developing lower limb OA.
2) identify projected timeframes for Air Force officers to reach threshold exposures that may increase risk of developing lower limb OA.

Methods

- A desktop analysis of the 17-week Air Force Initial Officer Course (IOC) was undertaken to identify frequencies and durations of exposures to selected physically demanding occupational tasks
- Observations of IOC trainees during training days were undertaken to validate the desktop analysis
- Surveys of training officers were used to triangulate the program in the desktop analysis in relation to the training days observed
- A Job Exposure Matrix was developed using this data and compared to threshold exposures recognised by the Australian Repatriation Medical Authority's (RMA) Statements of Principles' to be associated with increased risk of developing lower limb OA
- Projected exposures assumed that exposures in officer training would continue at the same rate post-training.
- Ethics approvals were obtained from the Defence and Department of Veterans' Affairs Human Research Ethics Committee (Protocol number: 037-18) and the Bond University and Charles Sturt University Human Research Ethics Committee

Air Force officers had projected annual cumulative exposures of **988 hours of carrying loads ≥5kg** and **107,530kg of lifting loads**.

In **7 years and 31 weeks,** following commencement of service, Air Force Officers could reach the **cumulative lifting thresholds** set under RMA's reasonable hypothesis scenario for **increased risk of lower limb OA**

Photo by POIS Rick Prideaux. Retrieved from http://images.defence.gov.au/S20161140

Results

Exposures to carrying, climbing stairs, kneeling and squatting during the IOC alone were insufficient to reach any of the RMA-specified thresholds for increasing risks of the development or clinical worsening of lower limb OA.

However, based on exposures estimated for the IOC, Air Force officers would reach the reasonable hypothesis scenario's threshold exposure specified by the RMA for increased risk of lower limb OA, based on having lifted weights of over 20kg to a cumulative total of 100,000kg within 7 years and 31 weeks of commencing service.

Conclusion and implications

Cumulative exposures to lifting heavy weights (≥20kg) may increase the risk of Australian Air Force officers developing lower limb OA.

Review of officer training practices should aim to reduce heavy lifting (≥20kg) while weight bearing through legs, where possible, to support workforce preservation and veteran wellbeing.

Where such occupational demands are unavoidable, efforts should be aimed at reducing other risk factors for lower limb OA, such as high BMI and history of previous injury.

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